

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A heat exchange reactor, comprising:

at least one tube bundle comprising a plurality of tubes arranged substantially parallel to a common longitudinal axis and within an external pressure housing, said bundle comprising first and second ends in respective first fluid communication with at least one first fluid inlet and at least one first fluid outlet, and said external pressure housing comprising at least one second fluid inlet and at least one second fluid outlet;

at least one baffle oriented substantially perpendicular to the longitudinal axis and disposed about said bundle and configured as a manifold to control a flow of said second fluid; and

at least one layer of interior thermal cement-bound refractory insulation disposed between said bundle and said housing and in fluid communication with said second fluid,

wherein said insulation comprises a load-bearing zone configured to support an average compressive load of at least one pound per square inch and a non-load bearing zone configured to support an average compressive load of less than one pound per square inch,

and

wherein said insulation is made from a first material in said load-bearing zone and a second material in said non-load bearing zone, and wherein said first material is different from said second material.

2. (Original) The reactor according to claim 1, further comprising a plurality of said baffles.

3. (Original) The reactor according to claim 1, wherein said baffle has a planar polygonal shape.
4. (Original) The reactor according to claim 1, wherein said baffle has a planar polygonal shape with n sides and n corners.
5. (Original) The reactor according to claim 4, wherein n is 4.
6. (Original) The reactor according to claim 1, wherein said insulation comprises a sealing groove, and wherein a portion of said baffle is mated to said sealing groove.
7. (Original) The reactor according to claim 6, further comprising at least one compliant sealing material disposed between said sealing groove and said portion of the baffle.
8. (Previously Presented) The reactor according to claim 1, wherein said baffle includes a plurality of holes, and wherein said plurality of tubes extend through said plurality of holes.
9. (Cancel)
10. (Previously Presented) The reactor according to claim 1, wherein said insulation supports said tube bundle.
11. (Cancel)
12. (Cancel)
13. (Original) The reactor according to claim 1, further comprising at least one selected from the group consisting of support means, ancillary equipment, heat exchanger means, burner means, adiabatic reactor means, absorbent means, adsorbent means, plumbing means, and combinations thereof.

14. (Original) The reactor according to claim 1, wherein said insulation comprises at least one parting plane parallel to said tubes and perpendicular to a plane of said baffle.

15. (Original) A method for exchanging heat, comprising heating or cooling a first fluid with a second fluid in the heat exchange reactor according to claim 1.

16. (Original) A method of carrying out a reaction, comprising carrying out a reaction in a first fluid while exchanging heat with a second fluid in the heat exchange reactor according to claim 1.

17. (Previously Presented) A method for making the heat exchange reactor according to Claim 1, comprising:

- (a) preparing at least one tube bundle comprising the catalysts, a plurality of substantially parallel tubes and at least one baffle disposed about said bundle;
- (b) mating a portion of said baffle to at least one sealing groove in a layer of thermal insulation; and
- (c) contacting the insulation with the external pressure housing.

18. (Previously Presented) A method for making the heat exchange reactor according to Claim 1, comprising:

- (a) fabricating said housing;
- (b) contacting at least one layer of the thermal insulation with the housing;
- (c) mating a portion of at least one baffle to at least one sealing groove in the insulation to form an assembly fixture; and
- (d) assembling the tube bundle with the assembly fixture.

19. (Cancel)

20. (Previously Presented) The reactor according to claim 1, wherein said plurality

of tubes are arranged in a rectangular array or a square array.

21. (Previously Presented) The reactor according to claim 20, wherein said external pressure housing has a rectangular or square cross-section.

22. (New) A heat exchange reactor, comprising:

at least one tube bundle comprising a plurality of tubes arranged substantially parallel to a common longitudinal axis and within an external pressure housing, said bundle comprising first and second ends in respective first fluid communication with at least one first fluid inlet and at least one first fluid outlet, and said external pressure housing comprising at least one second fluid inlet and at least one second fluid outlet;

at least one baffle oriented substantially perpendicular to the longitudinal axis and disposed about said bundle and configured as a manifold to control a flow of said second fluid;

at least one layer of interior thermal cement-bound refractory insulation disposed between said bundle and said housing and in fluid communication with the second fluid; and

an auxiliary heat exchanger provided at said at least one first fluid outlet and said at least one second fluid inlet or at said at least one first fluid inlet and said at least one second fluid outlet, said auxiliary heat exchanger being configured to exchange heat between the first fluid and the second fluid, said auxiliary heat exchanger being provided within said external pressure housing,

wherein said insulation comprises a load-bearing zone configured to support an average compressive load of at least one pound per square inch and a non-load bearing zone configured to support an average compressive load of less than one pound per square inch.